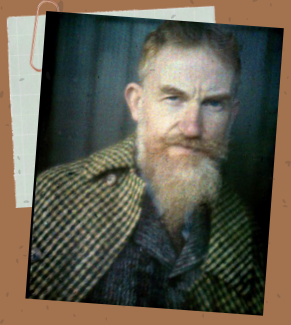

Old Photo Restoration Writeup

Prepared by :

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Abstract:

Photos are taken to freeze the happy moments that otherwise gone. Even though time goes by, one can still evoke memories of the past by viewing them. Nonetheless, old photo prints deteriorate when kept in poor environmental condition, which causes the valuable photo content permanently damaged, So, in order to bring back memories, we need a way to restore the resolution of old photos. In this project, we will work on that.

Design:

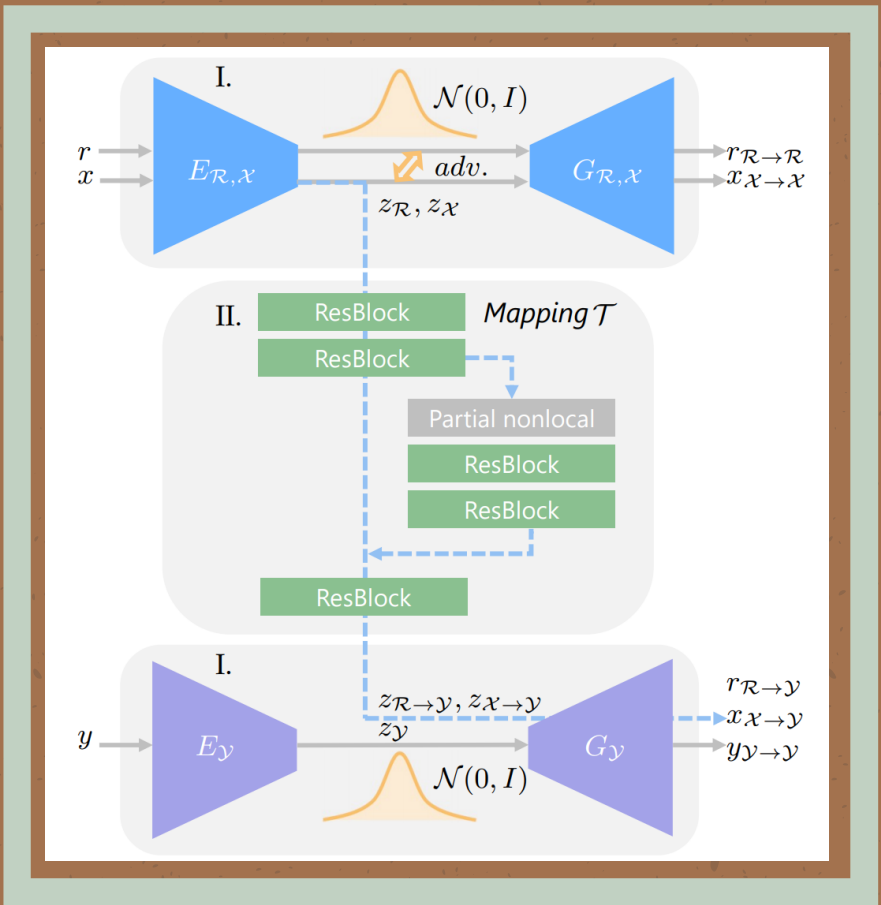
We want to restore old photos that suffer from severe degradation through a deep learning approach.

Data:

We trained all the methods with the same training dataset (Pascal VOC) and test them on the corrupted images synthesized from (DIV2K) dataset.

Algorithms:

We trained two variational autoencoders (VAEs) to respectively transform old photos and clean photos into two latent spaces. And the translation between these two latent spaces is learned with synthetic paired data. This translation generalizes well to real photos because the domain gap is closed in the compact latent space. Besides, to address multiple degradations mixed in one old photo, we designed a global branch with a partial nonlocal block targeting the structured defects, such as scratches and dust spots, and a local branch targeting the unstructured defects, such as noises and blurriness.



Communication:

We tested our model using a variety of old photos, and the results were as follows:

Tools:

SciPy
pandas
struct
NumPy

PIL
CV2
Skimage

os
sys
argparse

dlib
PyTorch